

Name \_\_\_\_\_ date \_\_\_\_\_

Earth Science Ch 3 Review Note sheet:

Using the website and PowerPoint lectures 3.1 to 3.4, copy down the definitions of the following key terms or key ideas into your notebook. When tests are labeled as "Open Note", you will be allowed to use these notes to answer your questions.

1: **rock** = a rock is any solid mass of mineral or mineral-like substance that occurs naturally as part of our planet.

2: **Three types of rocks**: igneous rocks, sedimentary rocks, metamorphic rocks.

3: **rock cycle** = interactions between Earth's water, atmosphere, and landforms can cause rocks to change from one type of mineral to another type. The continuous transformation of rocks from one type to another type is called the Rock Cycle.

4: **magma** = is molten (red hot melted) rock that is beneath the surface of the Earth.

5: **lava** = magma that reaches Earth's surface is called lava. Below the surface it is still magma.

6: **igneous rock** = when magma cools and hardens beneath the Earth's surface, or as a result of being expelled from the Earth in an eruption, it forms igneous rock.

7: **weathering** = is a process in which rocks on earth's surface are physically, or chemically, broken down into smaller pieces (sediments) by the force of water, air and living things.

8: **sediment** = is made up of weathered pieces of rock broken into smaller pieces by the forces of water, wind, and plant roots.

9: sediments get transported from one location to another by water, gravity, glaciers or wind.

10: **metamorphic rock** = sedimentary rocks can become buried deep within the Earth where they undergo extreme heat and pressure changes. Under this extreme heat and pressure, sedimentary rock will change into metamorphic rock.

11: **weathering and the transport of weathered materials** are processes powered by the energy from the sun and gravity.

12: **intrusive igneous rocks** = rocks that form when magma hardens beneath Earth's surface are called intrusive igneous rocks.

13: **magma** = consists of molten rock under the Earth's surface. Magma is primarily made up of silicon and oxygen plus other elements in smaller amounts. Magma also contains gases including water vapor. Because magma is less dense than solid rock it slowly works it's way upwards to the surface. As magma slowly rises it cools and gardens into igneous rock of different types.

14: **Granite** is a common form of igneous rock.

15: **Extrusive igneous rock** = When magma reaches the surface, such as in a volcanic eruption, it becomes lava. When this lava cools and hardens, it forms extrusive igneous rock.

16: **When classifying igneous rocks** = texture and composition are the two most important characteristics to look at when classifying igneous rocks.

17: **texture** = describes a rocks appearance based on size, shape, and arrangement of crystal structures

18: **composition** = is based on the mixture of light and dark crystals that form in the rock.

19: In igneous rocks, the **rate of cooling strongly** affects the rock's texture. Slow cooling results in larger crystals being formed. Rocks with large crystals are considered **course grained** in texture.

20: Rapid cooling of molten rock results in finer interconnected grains. Rocks of this type are considered **fine grained texture**.

21: Rocks that extrude onto the Earth very rapidly may not have time to even form crystals. These rocks result in a **glassy texture**.

22: **porphyritic** = Sometimes the crystals in rocks harden at different times and at different rates resulting in a mixture of large and small crystals mixed together. The resulting rock can have large crystals called **phenocrysts**. These rocks are called **porphyritic** in texture.

23: **granite** = igneous rocks in which light colored silicate materials quartz and feldspar are the key ingredient are said to be granitic in texture.

24: **basaltic rock** = rocks that contain dark silicate materials and plagioclase feldspar are said to have a basaltic composition. Basaltic rocks are rich in iron and magnesium.

25: **andesitic composition** = rocks with a composition between granite and basalt have an andesitic composition.

26: **Sedimentary rocks** form when existing rocks are broken into smaller sediments. When these small pieces are moved, deposited, and compact over time into layers and harden; they form sedimentary rock.

27: **chemical weathering** takes place when minerals in rocks change into new substances due to external forces.

28: **physical weathering** takes place when external forces such as wind, water, or plant roots break rock into smaller and smaller pieces that get carried to new locations by wind, water, ice or gravity.

29: **erosion** involves weathering and the removal of rock.

30: **deposition** = When wind or water that is carrying sediments to a new location loses some of its energy, it drops the sediments. This process of dropping the sediments in a new location is called **deposition** (to deposit).

31: sediments get dropped during deposition according to their weight and size. The largest-heaviest are dropped first while the smallest particles (sand) get carried the farthest, often all the way out to the ocean.

32: **lithification** = after sediments are deposited, they harden over time becoming **lithified** (hardened into rock).

33: 2 processes that contribute to **lithification** are compaction and cementation.

34: **Compaction** is the squeezing of moisture out of sediments by the weight of sediments above it.

35: **Cementation** takes place when dissolved minerals fill tiny spaces between small rocks and harden, binding the entire mass together into a mixture of rocks.

36: **Clastic sedimentary** rocks are usually made up of clay and quartz. Clastic sedimentary rocks are classified according to the size of the sediments in the rocks. Large rounded gravel bonded together creates **conglomerate**. When particles have non-round sharp angles the rock is **breccia**. If the rock is made from fine grain sand-sized particles bonded into a harder rock, it is called **sandstone**.

37: **chemical sedimentary rocks** form when substances dissolved in water precipitate from solutions. Salt from salt water is an example of this type of mineral.

38: **Biochemical sediments** are made up of shells and skeletal remains of organisms that have settled to the ocean floor and compacted over time. Limestones are formed from biochemical sediments. Two examples of such minerals are coquina (shells bonded together in a conglomerate) or white chalk.

39: **metamorphism** means "to change form". Rocks that undergo metamorphism change from one form to another.

40: **contact metamorphism** = during contact metamorphism, hot magma moves into rock areas producing minor changes to rocks in a low-grade metamorphism.

41: when large areas of rock are subjected to extreme heat and pressure changes, extreme alterations of the rock occurs on a large scale in what we term **high-grade metamorphism**.

42: The **three main agents of metamorphism** are

- Heat
- Pressure
- Hydrothermal solutions

43: **Heat** is the primary agent of metamorphism providing the energy needed to create chemical reactions. These reactions often cause minerals to recrystallize, changing their shape into new forms or materials.

44: As one goes deeper into the Earth, both pressure and heat increase triggering greater degrees of metamorphism.

45: **Magma** under the Earth's surface causes metamorphism when it comes into contact with cooler rock.

46: Pressure under the Earth's surface can cause the spaces between a mineral's grains to close up over time, recrystallizing. This results in more compact rock with equal weight but less size=greater density.

47: Increases in heat and pressure cause rocks to **flow**, flattening and stretching over time, rather than to break. Over long periods of time this can cause deep elongated folds to form in layers of rocks.

48: **hydrothermal solutions** = when solutions that are a mixture of hot water and dissolved minerals escape from magma, they are called hydrothermal solutions. Hydrothermal solutions often make their way to Earth's surface and come into contact with other minerals, cooling and depositing their minerals in the process.

49: **Igneous rocks** can be **classified** into 2 categories: foliated and nonfoliated.

50: **Foliated rocks** have a striped appearance; the result of minerals recrystallizing with a preferred orientation.

Metamorphic rocks that do not have this banded-striped appearance are called **nonfoliated metamorphic rock**. Marble is a good example of a nonfoliated metamorphic rock.